Rank Xerox Electronic Documentation
Solution for Xerox Printers

Laser 3270
Programmer's Guide

Doc. no. D62077   Revision 00

WARNING:
This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart B of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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Preface

August 1997

*Please note that all products will be referred to as the "3270 protocol converter" or simply the "converter".*This manual applies to the *3270 Protocol Converter* - the advanced use and programming of it.

> **NOTE:**
> **Not all FSL functions and functionality described in this programmer's guide may be supported in the products referring to this manual. Please refer to your respective user's guide for a precise definition of supported functionality.**

This section contains a description of all the features and functions which are *identical* in FSL, PCL and XES mode. Please note that some features will be briefly introduced in this section and then elaborated on in the separate printer driver Programmer's Guides listed below.

> **NOTE:**
> **As the printer drivers vary somewhat in functionality, on the diskette supplied you will find two separate documents describing the differences:**
>
> **D62071: FSL 3270 Programmer's Guide**
> **D62030: PCL 3270 Programmer's Guide**
> **D62067: XES 3270 Programmer's Guide**

FSL 3270 Programmer's Guide
A description of how to program the product in **FSL mode**. The manual contains a full list and description of the supported setup functions (i.e. FSL functions).

PCL 3270 Programmer's Guide
A description of how to program the product in **PCL mode.**The manual contains a full list and description of the supported PCL setup functions.

XES 3270 Programmer's Guide
A description of how to program the product in **XES mode.** The manual contains a full list and description of the supported XES setup functions.

The manuals describe the configuration of the *3270 Protocol Converter* to a specific printer or a specific application.

The reader must have basic knowledge and understanding of IBM computer systems, especially the IBM 3270 Information Display System. The reader should also be familiar with the printer that will be connected to the specific product in question.

Related Manuals

The original manuals for the PCL printer.

The original manuals for the IBM printers

"IBM 3268 Printer Models 2 and 2C Description"
IBM Order No. GA27-3268

Contains information on the IBM *3268* printer emulated.

Table of Contents

1. Introduction

The *3270 Protocol Converter* enables any Xerox laser printer to be connected to an IBM computer system.

Printer Drivers- FSL, PCL and XES

With the *3270 Protocol Converter* you have the option of selecting between three printer drivers, the **FSL**, the **PCL** and the **XES** printer driver (only up to two drivers supported at a time in any given product).

All printer drivers may *not* be supported in all the products. Please check your User's Guide supplied with the product for the exact printer driver(s) supported.

For selection/changing of printer driver, you are referred to your specific User's Guide as well.

NOTE:

In case the converter is equipped with a serial connector, it supports serial input or output.

In all three printer drivers, centronics input and output is supported. The *3270 Protocol Converter* can be used with most Xerox printers.

> **NOTE: The printer driver must be selected before you start the operation of the device.**

1.1. FSL Printer Driver

To select the FSL printer driver, see the User's Guide originally supplied with your product.

This printer driver is a user specific printer driver ready for programming.

You will have to program the internal setup of the protocol converter to suit your printing requirements. See the **FSL 3270 Programmer's Guide, D62071** for further configuration in FSL mode.

When to use the FSL driver:

- If you need serial output from the converter to connect a printer or other device that needs serial input.

- If you want to send printer commands directly to the printer

- If a printer without PCL4 or PCL5 emulation should be connected.

1.2. PCL Printer Driver

To select the PCL printer driver, see the User's Guide originally supplied with your product.

The default configuration of the converter will suffice for most application programs and uses. You should only change the configuration if you have special requirements.

If you should wish to change the configuration, the options may be set from the line as described in this manual. See the **PCL 3270**

Programmer's Guide, Doc. no. D62030

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- Full IBM 3268/87 and 4214 emulations including the APL feature and all applicable RPQs (subject to restrictions of the ASCII printers).

- Serial input or output (in case of serial connector)

- Access to all the special facilities on your Xerox printer from the host.

- Automatic input sharing between Coax, Centronics and RS (in case of serial connector) input.

- Coax FSL setup via Centronics.

- Support of up to 8 user strings of variable length can be transmitted to the printer from the converter - automatically at power on and before and after Local Copy from the host system.

- Up to 16 translate tables (8 for text and 8 for APL) which may be modified as you wish. Each character from the host may be transmitted to up to 12 ASCII characters.

- Flash PROM allowing the downloading of new firmware via the coax or the Centronics port.

- Full backwards compatibility with existing products.

- Support of ida PSS software package

1.5. *3270 Protocol Converter* Programming

The *3270 Protocol Converter* uses a large number of internal setup functions. See *Chapter 2. Function Selection via the Line* When the converter is installed and connected to a printer, you may have to consider the use of these settings.

> **NOTE: (If running in FSL mode)'**
> **The converter should be programmed to make your decentralized printer as fully 3268/3287 compatible as possible. This is particularly important in an SNA/LU1 environment.**

The settings can be downloaded as special commands from your IBM system or from a PC to the Centronics or RS 232 (in case of serial connector) input port. The converter uses these commands for its own internal setup.

Initially, the settings can be downloaded to the temporary memory area (see *Chapter 3. Manipulation of Temporary and Permanent Memory Areas*) of the converter, where they take immediate ef fect. The settings in the RAM area may be saved permanently in the permanent memory area, if specified by a special command. The permanent memory area is read each time power is turned on to the converter or when you give a special command.

1.6. Serial Input/Output

NOTE:
This section only applies if your product is equipped with a serial connector

The serial port can be configured as input or output.

SERIAL OUTPUT
For **serial output**, the FSL printer driver has to be used.
For details on this, please see doc. no. D62071.

SERIAL INPUT
For **serial input**, you can use both FSL and PCL printer drivers. For details on serial input, please refer to relevant chapters in D62071 (FSL) and D62030 (PCL) for details.

2. Function Selection via the Line

Function Selection via the Line (FSL) sequences are special commands used for the downloading of settings to the *3270 Protocol Converter*.

The syntax of an FSL command is shown below.
"%" is the defined escape character (i.e. ESC character). See the section on "Escape Character" in the following.

%Y<Function number>, <parameter>%

Syntax of an FSL command

When you send the FSL syntax to the *converter* via the line, the "Y" and the following number will select an FSL Function.

All spaces and IBM control codes between the leading and the trailing ESC characters will be ignored.

The FSL Functions are used for setting up the printer to special applications, to carry out a special print job, or to gain access to special facilities in the printer. A complete description of the supported FSL Functions for the printer drivers FSL , PCL and XES are found in documents no. D62071, D62030 and D62067 respectively.

The Function numbers and parameters are listed as data options along with a description of the results of selecting each option. The parameters set the selected Function as required.

2.1. Escape Character

If you wish to program the converter, you must first define an "ESC character "[1]. An ESC character is a signal to the converter that the characters following the ESC character form a command sequence.

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[1] In this manual, the *ESC character* is synonymous with the *defined escape character* Do not confuse it with the ASCII escape control code (1B HEX).

Once a character has been defined as the ESC character, it cannot be printed or used as a normal character. However, it is not necessary to have an ESC character defined permanently. When the ESC character has served its purpose, it can be deleted.

When you have defined an ESC character in the converter, the following facilities will be available to you:

- Sending HEX codes (00 to FF) directly to the printer

- Changing the settings of the *converter*

- Sending special commands to the *converter* (e.g. to save the contents of the temporary memory in the permanent memory).

When the *converter* receives the characters following the ESC character, it will use them for special purposes.

Below you will find examples of FSL commands, where "%" is the defined ESC character :

Escape Sequence	*Function*
%Y6,100%	Set Function 6: Maximum Print Position (MPP) to 100
%Y8,04%	Set Function 8, LU1 Language, to Belgian
%Y61,1,1B,26,6C,32,58%	Define user string 1 with the PCL command "print 2 copies"

NOTE:
In FSL mode, the notations ":" and ";" have special meanings in the FSL Functions 75 and 80. See D62071, the section "Overwriting the Translate Tables" for more information.

2.1.1. Defining Temporary Escape Character

No ESC character is defined when you receive the *converter*. If you wish to change the settings from the host system, you will have to define the ESC character . See below how to define "%" as the temporary ESC character .

NOTE:
The characters "," ";" and ":" must never be used as ESC character s, as they are used as separators in escape sequences and will give unpredictable printing results.
The same applies to 0-9, A-F, a-f and K,S,T,X,Y,Z, simple quote ('), & and ?. These must not be used.

CAUTION !
Avoid using your national characters as ESC characters.

The following EBCDIC HEX codes have been defined as national language characters and must not be used as ESC characters.

4A 4C 4F 5A 5B 5F 6A 79 7B 7C 7F A1 C0 D0 E0

&&??%

Defining "%" as a temporary ESC character .

The five characters shown should be sent to the printer from the host system. The ESC character is **not** defined permanently. When the converter is turned off, it will be lost. See "Defining a Permanent Escape Character" for infor mation on the definition of a permanent ESC character .

2.1.2. Removing Temporary Escape Character

If you wish to remove the temporary ESC character so that it may be used as a printable character, you can define it as a blank as shown below.

&&??<blank>

Removing the temporary ESC character *.*

2.1.3. Defining Permanent Escape Character

The paragraph "Defining a temporary ESC character ", only described the temporary use of the ESC character .

If you wish to define and save a permanent ESC character in the printer, you will have to use Function 48, Select Perma nent Escape Character, and save the settings in the permanent memory by the command <ESC> X1 before powering off.

To program Function 48, a temporary escape character has to be defined first.

You can define the permanent ESC character in two ways:

1. In **hex** value, e.g. %Y48,09%

2. In **apostrophe** notation, e.g. %Y48,'<'%

```
&&??%         Define temporary escape
%Y48,'<'%     Define permanent escape
<X1>          Store settings
```

NOTE:
If the character used in Function 48, Select Permanent Escape Character, is different from the one specified as temporary ESC character, the latest specified character will take precedence immediately.

2.1.4. Removing Permanent Escape Character

If you wish to remove the permanent ESC character , you will have to follow the procedure below:

1) Set Function 48, Select Permanent Escap e Character, to "00" (No ESC character).

2) Define a new temporary ESC character as described in "Defining a Temporary Escape Character".

3) Save the settings using the command "<ESC> X1".

Examples of these commands are shown below:

```
>Y48,00>

&&??%

%X1
```

Syntax of the command strings to remove the permanent ESC character *(">"). "%" is defined as temporary* ESC character *.*

2.2. Sending HEX Codes

When an ESC character has been defined, you may send any HEX code to your printer. Below you will see an example of how this is accomplished ("%" is the defined ESC character).

```
%% 1B 28 38 55 %
```

Structure of a command string. This command will select the Roman 8 symbol set in a PCL printer

The string sent above is a command string for a specific printer. The two leading ESC characters tell the *converter* that the following characters should be treated in pairs as HEX codes until the next ESC character is registered in the datastream. Such commands may be found in the manual for your printer.

NOTE:
In command strings in hex pair notation, only the hexadecimal characters 0-9 and A-F are allowed. The specifying of any other character may give unpredict-able printing results.

Between the two leading and the trailing ESC characters all IBM control codes, spaces, and the character "," will be ignored by the *converter*. They may be inserted in command strings to facilitate the reading of the datastream.

2.3. Apostrophe Notation

Another way of sending printer commands strings is to use the apostrophe notation. Apostrophes tell the *converter* that the characters following should be regarded as ASCII characters in the commands. Below you can see an example of this.

%%1B '\12'%

Structure of a command with the apostrophe notation

The above example shows the command code 1B (HEX) combined with the apostrophe notation.

The apostrophe notation can only be used in connection with trans-mission of characters in the LU3 character table. All IBM control codes are ignored in command strings.

To ensure correct processing of the data, all spaces in the string must be sent as the hexadecimal value (HEX 20). If e.g. you wish to transmit "*270 C/RS*" the sequence should be sent as shown in the following:

&&??%   Define temporary escape
%%''270'20'C/RS'%

Syntax of a command with a blank sent in apostrophe notation

NOTE:
The apostrophe notation may also be used in the programming of Function 61, "Setup for User Strings", Function 62, "Setup for IBM Defined Strings", Function 63, "Define Logos" (FSL & PCL only), Y100 "Printer Sharing", Y90 "Define User Escape String", and the Functions Y92-94.

CAUTION:
**These facilities should be used with care! If they are used for alteri
vertical format, horizontal format, or positioning, the system settin
may no longer prove reliable.**

2.4. Testing via the Line

Tests may be selected via the line by a special command. The syntax of the test selection is as follows:

%T<test no.>

3. Manipulation of Temporary and Permanent Memory Areas

When your settings have been downloaded to the temporary memory through the FSL Functions, you may wish to save them permanently for future uses. For this purpose, special commands can be used.

Once the settings have been saved, the *converter* will read them each time power is turned on, or when it registers a special command in the datastream.

Section 3.1. The Three Levels of Settings and Section 3.3 *Action at Power On* explain the interaction of the three levels of settings and the actions taking place when power is turned on.

Section 3.2. Commands for Storing and Restoring Settings describes the commands that manipulate the temporary and the permanent memory areas. *Section 3.4. Restricting Access* explains the special facility which enables you to restrict access to the temporary and/or the permanent memory areas.

3.1. The Three Levels of Settings

The *converter* stores settings on three different levels:

1. The Factory Default Area

2. The Permanent Memory

3. The Temporary Memory

The temporary memory settings constitute the first level. When the *converter* operates, it always retrieves information from the temporary memory area to determine the next action required.

The factory default and permanent memory areas are used only when power is turned on, or when a specified command to read them is registered.

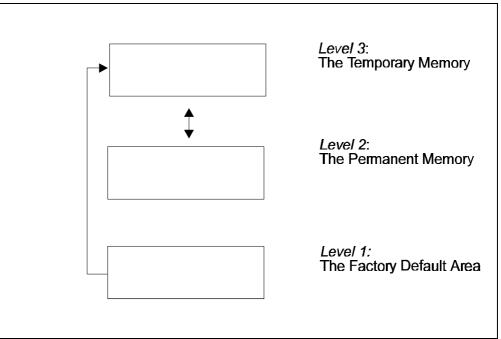See Fig. 3-1 below which illustrates the interaction of the three levels.

Level 3:
The Temporary Memory

Level 2:
The Permanent Memory

Level 1:
The Factory Default Area

Fig. 3-1 The three levels of settings

3.2. Commands for Storing and Restoring Settings

The following commands allow you to manage the temporary and the permanent memory areas. You may save the temporary memory settings in the permanent memory, or you may overwrite the temporary memory settings by loading the settings from the permanent memory or the factory default area.

Please note that when one of the commands below are used, the temporary ESC character, if any, will be removed.

Command	Description	Example
%X1	Use this command to save settings **permanently**in the interface memory. Without the %X1, change of settings will be lost at power off.	You send the command as follows: **&&??% %X1**
%X3	Read and activate factory default settings. Use this command if you have changed many settings and wish to start all over again.	You send the command as follows: **&&??% %X3**
%X4	Read and activate the permanent settings. Use this command if you have changed a couple of settings temporarily for a specific purpose. When you have used the temporary settings, you can erase them again by sending the X4 command.	You send the command as follows: **&&??% %X4**

3.2.1. Functions where power off/on is needed

Function 1   Buffer Size
Function 7   Case
Function 14   Enable Graphics
Function 15   Baud Rate
Function 16   Number of Data Bits for Serial Input
Function 17   Parity for Serial Input
Function 18   Number of Stop Bits for Serial Input
Function 24   Port Selection
Function 38   IBM Communication Feature

3.2.2. Functions with no need for %X1 storing

Function 19   Duplex Printing (☞ PCL & XES only)
Function 49   Restrict Access
Function 63   Define Logo (☞ FSL & PCL only)

3.3. Action at Power On

When you apply power to the *converter*, the following procedure will be executed:

1. The permanent memory will be read to determine whether it contains valid data. If so, the data will be loaded into the temporary memory and normal operation will be started on the basis of the permanent settings.

2. If the data in the permanent memory area is unreadable, it will be cleared. The factory defaults are then read, and an error message will be printed containing a description of the action taken. See the chapter on Error Messages in the FSL and PCL programmer's guides. Operation starts on the basis of the factory default settings.

3. The *converter* checks the printer. If the printer is malfunction ing, the *converter's* indicators will signal an error.

3.4. Restricting Access

This facility allows you to restrict access to the temporary memory and/or the permanent memory areas. The command is an FSL command which will have effect as soon as the *converter* receives it. See the example in the following and Function Y49 in the list of supported FSL Functions for the two printer drivers.

Escape Sequence	Function
%Y49,0, (opt., password)%	Remove access restriction to the permanent and the temporary memory areas
%Y49, 1,(opt., password)%	Restrict access to both the permanent memory and the temporary memory
%Y49,2,(opt., password)%	Restrict access to the permanent memory

Fig. 3-2 Restricting and allowing access

If you wish to use the lock facility with password, you must contact your point of purchase to have the password facility installed. You should then lock the *converter* using your **own** password.

NOTE:
- **The password you specify when unlocking the box must match the password you specify when it was locked.**

- **Maximum length of the password is 10 characters.**

- **Function 49 need not be stored with the ESC X1 command.**

4. IBM 3270 Related Functions Special Settings

This chapter describes those FSL Functions specifically related to the requirements of the IBM 3270 system. SCS command related Functions, Functions which need to be stored and where powering off and on the *converter* is needed to inform the controller about the functionality, IBM RPQs and Intervention Required Timer (IRQ).

Some of the 3270 related functions are normally controlled from the front panel on an IBM 3268/87 or an IBM 4214 printer. On the IBM 3287/3268/4214 printers, it is also possible to change the following front panel settings via the line (in LU1 mode only).

Lines per inch (LPI): 3,4,6 or 8 LPI
Characters per inch (CPI): 10,12,15,16.7 CPI
Maximum Page Length (MPL)
Maximum Print Position (MPP)

The *converter* may be set up to emulate this control via the line on your printer.

LPI can be selected either by Function Y2, LPI, or by the SCS command SLD.

CPI can be selected either by Function Y3, CPI, or by the SCS command SPD.

MPL can be selected either by Function Y5, Form Length or by the SCS command SVF.

MPP can be selected either by Function Y6, Maximum Print Position or the SCS command SHF.

The settings emulating the front panel settings on an IBM 3287/3268/4214 printer is the value stored in Function 2,3,5 and 6 which will be the actual value at power on.

The IBM 3270 datastream also comprises attributes which can be used for selecting underscore, colour and APL.

For underscore selected by attribute, please refer to the FSL (D62071), PCL (D62030) or XES (D62067) specific manuals as

there are differences depending on which printer driver you have selected.

For colour selected by attrubute, the Function Y62 string options for colour have to be programmed. For details you are referred to the separate FSL , PCL and XES 3270 Programmer's Guides as the functionality of Function Y62 depends on which printer driver you have selected.

For APL characters selected by attribute, characters from the APL/LU3 character table will be used.

4.1. Page Presentation Media Command

This is an IBM command which is used for selecting print quality and feed device from the host system.

Function Y9, Print Quality, is used for defining a default font or print quality (draft quality or near letter quality).

Function Y11, Paper Path, is used for defining the default paper path (tractor feed or tray 1 or 2).

For details on this, please see the separate FSL , PCL and XES 3270 Programmer's Guides as there are differ ences depending on the selected printer driver.

4.2. Functions Read by the IBM Controller

There are exceptions to the rule that a function will have immediate effect when received.

The functions listed below are such exceptions. **They are only read at power up.**

Function 1, Buffer Size
Function 7, Case
Function 14, Enable Graphics
Function 38, IBM Communication Feature

When you have specified settings for these functions, you must save them in the permanent memory with ESC X1 command, turn printer power off for approx. 10 seconds and then back on again.

NOTE:
**If the *converter* is connected *directly* to an IBM 4331
or 4361, the buffer size of 1920 characters (Function
Y1=2) should be specified, due to a hardware
restriction on the mainframe.**

4.3. IBM RPQ Settings

The Functions 25 to 33 are similar to the RPQs you can order for an
IBM 3287 or IBM 3268 printer as shown in the following table. On the
IBM 4214, you may set the options from the front panel.

The charts below show the correspondence between interface
functions and IBM RPQ numbers.

Function no.	3287 RPQs	3268 RPQs	4214 RPQs
25	N/A*)	N/A	N/A
26	SC3750	SC9508	Opt. 20=3
27	SC3741	SC9505	Opt. 18=3
28	S30219	SC9501	Opt. 15=1
29	S30219	SC9502	Opt. 15=1
30	N/A	SC9503	Opt. 16=2
31	SC3749	SC9504	Opt. 17=2
32	SC3739	SC9506	Opt. 19=1
33	SC3740	SC9507	Opt. 20=2

*) N/A: Not Applicable

Function no.	4028 RPQs	3812/16 RPQs	3912/16 RPQs
25	N/A*)	N/A	N/A
26	Set. 25	Switch C16	
27	Set 31	Switch C22	PrintImage
28	Set. 27	Swtich C18	CR at MPP+1
29	Set. 28	Switch C19	NL at MPP+1
30	Set. 29	Switch C20	FF Data
31	Set. 30	Switch C21	FF Last
32	Set. 32	Switch C23	FF Valid
33	Set. 33	Switch C24	Auto Function

*) N/A: Not Applicable

If formatting problems occur at the initial installation of the *converter*, these problems may be solved by selecting the settings matching the appropriate IBM RPQs. However, as the RPQ settings interact to a great extent, it is recommended that you contact your point of purchase for details.

4.4. IRQ Time

IRQ (Intervention Required) is a 3270 command which signals to the host that action is required at the device (paper out, forms jam, etc.)

Function Y46, IRQ Time, allows you to adjust the period from the error occurs until the IRQ signal is sent to the host. The value of this function should not be too low, as a pause may arise in the printing, when the system fills up the printer buffer with e.g. complicated graphics or several copies.

IRQ may be completely disabled. This can be useful as some systems will retransmit the last buffer after the intervention required message. This means that the buffer contents will be printed twice and that the form feed may be placed wrongly in the data stream.

Function Y46 has 3 parameters:

- Printer error
- Hold time out
- Busy time out

An IRQ will be sent to the host if the time defined in one of the parameters expires.

As the signals on the Centronics may differ from one printer to the other and as the serial output (if supported) is not only related to the printer but also to the serial cable used, the *converter* will act differently depending on which printer is connected. In the following you will find examples of how various signals are interpreted and handled. The Centronics or serial signals are stated with capital letters.

- If a "FAULT" or "PAPER ERROR" signal is received by the *converter*, it is handled as a *printer error*.

- If a "DESELECT" signal is received but no "FAULT" or "PAPER ERROR", it is handled as a *hold* situation.

- If a "BUSY" signal is received but no "DESELECT", "FAULT" or "PAPER ERROR" signal, it is handled as a *busy* signal. In order to completely disable the IRQ, you must set all parameters to "00"

NOTE:
IRQ caused by printer deselect (Y46, value 2, Hold Time Out) cannot be changed. It can be *disabled* by setting Y46, value 1 to 0 (IRQ because of printer error)

If IRQ caused by printer error (Y46 value 1) is set differently from zero, then Y46 value 2 (Hold Time Out) will be sent after 10 minutes.

5. Serial Input

NOTE:
This section only applies if your product is equipped with a serial connector.

The serial port is connected to the serial output on a PC or similar source to enable sharing the printer with the host.

For this connection you need a spare cable ending in a 25-pole RS connector (order no. 076183).

To use RS 232 input, Function Y24, "Data Input/Output Port Selection" must be set to zero (0) which is factory default (see Supported FSL Functions in the relevant *printer driver Programmer's Guide enclosed on your original documentation kit diskette).*

On the PC you must also make the following settings match the default settings on the box.

Baud rate	=	9600 baud
Number of data bits	=	8 bits
Parity	=	None
Number of stop bits	=	1 bit

It this is not possible, you must change the Functions 15, 16, 17, and 18 on the box to match the PC's value.

NOTE:
Programming of Functions 15,16,17,18 and 24 is not possible via the serial port. These functions have to be programmed either via the coax or via the parallel input port.

6. Printer Sharing

The *3270 converter* enables printer sharing between the system and a PC. For this purpose it is possible to specify a timeout period.

If, for example, the printer is receiving input on the parallel port and there is a break in the transmission of data, the other input ports will not be polled for the period specified.

The factory default timeout is 20 seconds. The timeout may be changed to suit your requirements. This is done by sending a new setup to the *3270 converter* input port where you want it to take effect.

When specifying the timeout it is possible to specify a user string . A user string may be used to reset the printer, for example .

NOTE:
Settings on the coax input port are automatically re-established after another input port has been using the printer.

On the parallel and RS input port (if equipped with a serial connector), you have to program the required setup yourself.

As there are differences between the printer drivers in relation to printer sharing, you are referred to either the FSL (D62071), the PCL (D62030) or the XES (D62067) 3270 Programmer's Guides for in depth details.

7. Printer Initialization by User Strings

This chapter covers the facilities of the *converter* activated by simple commands and related to special FSL Functions. The FSL Functions and the *converter* commands are grouped according to their tasks.

7.1. The User Strings

In the *converter* you may save up to 8 user strings (0-7). They can be sent as follows:

- When the *converter* is powered on (if specified in Function Y51, User Defined String(s) at Power On).

- After a printer error (if specified in Function Y52, User Defined String(s) at Printer Power On/Printer Error).

- Activated by a special *converter* command

- Before and/or after an *converter* error message

- Before and/or after a local copy

The user string has to be defined in Function Y61 and will in all the mentioned examples be sent directly to the printer.

> **NOTE:**
> **The contents of the sequence in Y61 must be defined in ASCII characters as it is sent directly to the printer.**

You can also define a user string which can change the internal setup functions. Then you will have to use Function Y90, "Define User Escape Strings". For details, please see *Section 7.2. User String as Input.*

As the PCL and XES drivers are pre-programmed, the user string feature is not very usable here. With the FSL driver, however, it is an essential facility. For further information see the FSL 3270 Programmer's Guide, D62071.

Below is shown the syntax of sending a user string under host control ("%" is the defined ESC character). Once the user string has

been programmed, you only need to enter 3 characters in the data-stream to send the user string to your printer.

%Z<user string no. >

Sending user string under host control

Several functions relate to the user string facility. Among these functions are:

- Function Y61, Setup of User Strings, used for the defining of the user strings.

- Function Y51, User Defined Strings at Power On, used for specifying the "Power On" string

- Function Y52, User Defined Strings at Printer Power On/Printer Error, specifying the Error Recovery strings.

Examples

Escape Sequence	Function
%Y61,3,1B,45%	Defines string 3 with the PCL command for "RESET".
%Y51,1,5,7%	Send strings 1,5,7 at power on
%Y52,4%	Send string 4 at printer error
%Z6	Send string 6

Fig. 7-1 User string commands

7.1.1. User String as Input

Function Y90, User Escape String Definition is used to define a string which can be sent to the interface as input. Since the string is sent as input to the interface it can be used to change FSL setup functions.
In Function 90, you may define strings with "identifiers" in HEX depending on the available memory area in the permanent memory area. These strings are sent as input to the interface when escape "identifier" is received via the line.

%Y90,1A,'ABCD':8F,'%Y2,8%'%

Here, 1A, 'ABCD' will exchange future occurences of escape 1A with ABCD. The rest of the sequence (:8F,'%Y2,8%') will exchange future occurences of escape 8F with %Y2,8% (to select 8 LPI).

As there are differences between the printer drivers in connec tion with printer sharing, you are referred to either the FSL (D62071), the PCL (D62030) or the XES (D62067) 3270 Programmer's Guides.

Appendix A: RS 232/V24 Cable Connection(serial support)

Using the serial port

The following connections are available in the serial plug:

pin 1   NC
pin 2   RX data
pin 3   TX data
pin 4   DTR
pin 5   GND (Signal)
pin 6   DSR (Busy)
pin 7   RTS (always high)
pin 8   CTS
pin 9   N.C.

Example: Cable connections to HP LaserJet III:
converter   HP LaserJet III
Cable type: DB9 male   Cable type: DB25 male

pin 2: _____ pin 2
pin 3: _____ pin 3
pin 4:   _____ pin 7
pin 5: _ |

       _____ pin 20

pin 6: _ |
pin 7:

If the attached printer supports X_ON/X_OFF, you should use the following protocol for the simplest setup.
You only require the following cable:

converter   Printer[2]
Cable type: DB9 male   Cable type: dB25 male
pin 2: _____ pin 2
pin 3: _____ pin 3
pin 5: _____ pin 7
pin 6: ____
pin 7: ____ |

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[2]For further information, please refer to the technical reference manual for the printer used.

Appendix B: List of Abbreviations

APL	A Programming Language
ASCII	American Standard Code of Information Interchange
APO	Automatic Page Orientation
CPI	Characters Per Inch
CR	Carriage Return
COR	Computer Output Reduction
DSC	3270 Information Display System data stream Compatibility
EBCDIC	Extended Binary Coded Decimal Interchange code
ESC	ESCape character
FF	Form Feed
FL	Form Length
FMH	Function Management Header
FSL	Function Selection via the Line
GFID	Font ID
HEX	HEXadecimal
HMI	Horizontal Motion Index
LF	Line Feed
LPI	Lines Per Inch
LU	Logical Unit
MPL	Maximum Page Length
MPP	Maximum Print Position
NL	New Line
NVRAM	Non-volatile Memory
PCM	Plug-Compatible Manufacturer
PCIA	Printer Control Information Area
PP	Print Position
RAM	Random Access Memory
ROM	Read Only Memory
RPQ	Request for Price Quotation
SCS	SNA Character String
SLD	Set Line Density
SNA	Systems Network Architecture

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